

rocks of the *first, second, third* and *fourth* groups may be due to subsequent faulting, but they are nevertheless more recent.

The accompanying map gives the general outline of the groups. I have used Prof. Frazer's section along the Susquehanna river for illustration with my interpretation. He produced the section through *Chickis* in his report C. C. of the Second Geological Survey. The changes I have made are on structural grounds.

*An Account of an Old Work on Cosmography. By Henry  
Phillips, Jr., A.M.*

(Read before the American Philosophical Society, January 16, 1880.)

It has occurred to me that as all knowledge is within the scope of our pursuits, an analysis of a work on Cosmography, the production of a once famous author, might not prove unacceptable. The errors among which men once blindly groped, the silly tales of wonderment with which returned travelers were wont to astonish their stay-at-home friends, the absurd statements once received as absolute facts, but later exploded by the Ithuriel-touch of truth, now at these later days, when we are entirely freed from superstition, folly and ignorance, and a blind reliance upon the *ipse dixit* of anyone, may afford us a lesson pregnant with instruction. It is, therefore, with this view that I venture, this evening, to present to our Society an account of a book which bears for its title :

"Cosmographia Universalis Libri VI. in quibus juxta certioris fidel scriptorum traditionum describuntur omnium habitabilis orbis partium situs propriæque dotes, regionum topographiæ effigies. Terræ Ingenia quibus fit ut tam differentes et varias specie res et animatas et inanimatas ferat. Animalium peregrinorum naturæ et picturæ. Nobiliorum civitatum leones et descriptiones. Regnorum initia, incrementa et translationes. Regum et principum Genealogiæ. Item omnium gentium mores, leges, religio, mutationes; atque memorabilium in hunc usque ad annum 1559 gestarum rerum Historia. Autore SEBAST. MUNSTERO."

On the recto of the title-page appears the portrait of the author, an elderly, hard-featured man, beneath which are two Latin poems, laudatory of that distinguished person and his work. The preface is dated at Basle, March, 1550.

Sebastian Munster may serve us as an example of the scholars of the olden time. He was born at Ingelheim, in 1489, and became a Cordelier monk, but, having adopted the opinions of Luther, he renounced the robes and the yoke of a cloister and took to himself a wife. Such was the usual course in those days which the converted clergy took to show their hatred to the tenets of the church of Rome, where enforced celibacy was of primary importance, and weighed so heavily upon them.

For several years Munster taught at Basle, where he gave to the public many valuable works, having rendered himself so very learned in geographi-

cal and mathematical science, and in the Hebrew language, that he was known as the Esdras and the Strabo of Germany. The mere enumeration of his writings in Gesner's *Bibliotheca* occupies several folio pages. He died at Basle, of a prevailing pestilence, on the twenty-third day of May, 1552, in the sixty-third year of his age.

This book was one that became very popular and ran through many editions. It was published at Basle originally in 1550, then successively in 1569, 1574, 1578, 1592, 1598 and 1614. All these editions were in German. The *Cosmography* was issued in Latin in 1550 and 1554, having been translated by Munster himself. It was issued in French at Basle in 1552, and at Paris in 1575; in Italian at Bale, 1558. A selection from its contents, entitled "A treatise on the New India with other newe founde lande and islandes as well eastwarde as westwarde by Sebastian Munster, translated into English by Richard Eden," was published at London in 1553, and another translation, "A brief collection of strange and memorable things gathered out the *Cosmography* of Sebastian Munster," was published at London in 1574.\*

The book, which is crowded with quaint and rude wood-cuts, begins with a number of full-page maps, among which are the world on the Ptolemaean system (America, of course, not shown), surrounded by a border representing the various winds, Europe and its various divisions (embracing the kingdoms of Bohemia, Hungary, Poland), Africa, Asia and the New World. The British Islands were not of sufficient importance to warrant a special map and are crowded up towards the top of a general map of Europe in such a manner that very little of Scotland is shown. England was at this time under the dominion of Edward VI. (1547-1553), and the influence exercised by it upon the politics of Continental Europe was very inconsiderable; it was looked on, in fact, only as a semi-barbarian island in the far-off northern seas.

Naturally the author begins with the beginning and starts with the creation of the world, drawn from Biblical sources. To this chapter is prefixed a wood-cut representing the world as a plain from whose bounds arise lofty mountains, inhabited solely by animals. In the background is a circle of flames; in the foreground is an ocean with fishes and an old-fashioned high-pooped Dutch galliot, navigating apparently by its own instinct (for not a living being is anywhere to be seen upon it) the new-made waters. Sea monsters raise their heads from the billows and gaze with rapt amazement at the ship, taking it, doubtless, for some novel marine creation. Overhead are shining the sun, moon and stars, while God, represented as an old man with a papal tiara upon his head, is seated between the heavenly bodies upon a cloud. At each of the upper corners of the plate is an angel; at each of the lower corners a very satyr-looking demon.

Then follow chapters upon land, sea, islands, the earth with its vegetable and mineral wealth, earthquakes, hot springs and baths, fires existing

in the bosom of the ground, natural phenomena, metals and their mode of being mined, the mines and the spirits and devils who rule in them, and the localities where metals are found.

On page 9 is represented a man using the divining rod (*Glueck-ruth*) of forked witch hazel, that is turning in his hands as he steps over a place where mining operations are being conducted. A section of a hill is shown with men at work breaking ore and loading a rail car upon a tramway which leads to an elevator running up to a level with the opening of the mine.

On page 11 we find a machine in use for crushing the crude ore, represented as somewhat similar to a modern quartz crusher, the motive power of which is furnished by an overshot-wheel.

In speaking of the earth and its dimensions, the author says it is hollow in the centre; that this opening or void space is full of flames, and is hell; that it is of sufficient capacity to contain all the millions of damned souls that it will be required to hold. That the earth itself is round, about 5400 (German) miles in circumference, and about 1718 (German) miles in diameter.

There are accounts given of early sea navigation, the deluge, and the terrestrial paradise, of which latter there is an illustration exhibiting the Garden of Eden with a fountain in the centre, walled around with crenated battlements, a lofty tower rising from the middle of the enclosure, and we are also favored with a view of the trees of life and knowledge.

On page 37 we find a picture representing the migration of some early tribe, every one of whom, male and female, is dressed in the fashions prevalent among the Germans of the sixteenth century; before them is drawn a low truck containing standard stores for the journey, in which are several barrels distinctly suggesting to the mind of the observer the idea of beer. The parade is passing an old castle.

On page 42 occurs a description of the British Islands, accompanied by a map of the same. England has only three towns represented, viz: London, Dover, and what the engraver is pleased to call *Ochsenfurt* (Oxford). Scotland has only Edinburgh, and Ireland a large city in the extreme south, called *Vatford*. The shape of the British Islands is simply atrocious. It must be a mortification to an Englishman to consider of how little importance his country was but three hundred years ago, while kingdoms that now have sunk into oblivion and their names even lost, were then potent, flourishing, and even objects of dread.

The description of England is short, and contains nothing of interest. Speaking of Ireland, reference is made to the rebellion of 1534, and the great slaughter that followed in its wake. The manners of the Scotch are condemned, but their mental and moral qualities much praised; a statement is made that the use of coal for burning is so common, that in Scotland the beggars supplicate it for alms. In this kingdom is found the very wonderful stone known as *Gagates* (p. 45):

"A stone which, although of a rough and common appearance, yet partakes

somewhat of a Divine essence, for it kindles fire in running streams which nothing but oil can extinguish. If any one should drink the water in which this stone has been steeped, if there has been any stain upon the chastity of such a one, he (or she) will immediately be compelled to micturate, nor can he (or she) possibly avoid it; but if it is drunk by one who is pure, no such evil effects will result.”\*

The English language is thus spoken of: “It is a mixture of many tongues, especially German and Gallic. Formerly, as we learn from Bede, it was entirely Germanic, who thus writes: ‘The ancient inhabitants of England were accustomed to reckon their months according to the course of the moon, calling the moon *Mona* (which the Germans call *Mon*), and a month, *Montha*. December was called *Haleg monath* (i. e., Holy month), and April, *Eoster monath*, from a goddess named *Eostre*, to whom the Teutonic tribes were wont to sacrifice in this month in Pagan times. May was called *Thri melci* (thrice milked), because in that month they usually milked their cattle so often.’ This passage,” continues Munster, “is not to be in the printed copies of Bede’s works, but I found it in a manuscript which Glareanus ex Nigra Silva in 1545 sent here to Basle.”

Scotland possesses yet another wonder (p. 49):

“Here there are trees which produce a fruit enveloped in leaves; this when the proper time arrives falls down into the water below and is turned into a living bird which is called the *Tree Goose*. This tree grows in the island of Pomonia which lies to the north of Scotland at a short distance therefrom. This tree is mentioned by all the old Cosmographers, especially Saxo Grammaticus, so you must not think we have made up this account. Æneas Sylvius writes in this manner concerning it: ‘We have formerly heard that there was a tree in Scotland growing on a river’s bank, whose fruit was in the form of aniseed, which when it had come to maturity fell of its own accord, some on the land and some into the water; and those which fell on the land petrified, but those that alighted in the water soon receiving life began to swim and afterwards on their wings and pinions took to flight. When we were in Scotland in the reign of King James hearing of these things we endeavored to investigate them, all persons uniting in affirming the marvel, but the further to the north we traveled the further was removed the place of the miracle so that it was finally said not to exist in Scotland at all but in the Orcaes Islands.’”

The description is accompanied by a wood-cut representing the tree with its fruit in various stages of development. Some are entirely closed, some are a crack open, some have the heads of the birds peeping out of them. At the base of the tree is water within whose vivifying influences a number of these rare exotics may be seen disporting themselves. Owing to the favorable position of the tree, only two of its fruits are threatened with premature extinction by falling upon the dry land.

There is a map and metrical description of the city of Paris, dated 1548, and on page 185 is a large two page plate representing the theatre at Verona, in its perfect state as it formerly appeared, but of which “only ruins now remain.” It is a huge edifice built upon arcades and around it

\*The Venerable Bede speaks of a stone called *gagates*, and says: “It (Britain) hath much and excellent jet, which is black and sparkling, glittering in the fire, and, when heated, driveth away serpents.”



a river is flowing. It was ascribed to Octavius and is said to have furnished seats for 23,184 persons.

At page 249 is a description of the dialect formerly spoken in the island of Sardinia.

At page 408 is given a description of two terrible earthquakes which occurred at Basle in 1346 and 1356, accompanied by a wood-cut representing the overthrow of the city; the church steeples, palaces and houses being raised in the air and cast upon the ground.

At page 431 mention is made of curiosities found in the mines of Alsatia, as follows :

"There is in this region a lake extremely long and broad and deep, which contains many kinds of living animals and reptiles reproduced by nature in pure copper on the neighboring rocks so that they can be most easily recognized and known. That most learned man John Hobensack sent me a specimen of one of these stones which figure I have reproduced here."

According to the picture it is a very ugly looking fish, with a large head and fins close behind the junction of the head and body, and a single fin lower down; the body seems coated with plates like a crocodile, with a dividing line running up the back.

At page 488 occurs a description of the town of Mayence, in which is found a description of the invention of the art of printing, which is attributed to John Guttenberg.

At page 489 is a long description of the invention of cannon and gunpowder, which latter is ascribed to Bernhard Schwarz. A picture of the very rude artillery in use in those days accompanies the letter-press.

At page 493 occurs an account of the tradition of Bishop Hatto and the Mouse-tower, where it is stated that a similar tale is told of a king and queen of Poland (names not given) who, with their children, were devoured by mice. A woodcut shows the tower on an island in the Rhine, with the mice swarming up the walls, climbing into the windows, and gnawing at the foundations.\*

A monster born in the Palatinate is thus described on page 625 :

"In the year 1495, in the month of September, a woman at Bierstadt gave birth to a monster in the form of two girls, whose bodies were joined together at the forehead, so that they always looked into each other's eyes, but in all other respects were entirely distinct and separate. I (Munster) saw them myself at Mayence, in the year 1501, when they were about six years old. They were forced to have a common will, to walk together, to sleep and rise together; and when one went forward the other went backward. Their noses almost touched each other, and their eyes, instead of being straight to the front, were crooked to one side. They lived to be almost ten years old, at which time one of them dying, it was necessary from the decay of the corpse to cut them apart; but the wound mortified, and the survivor quickly followed her sister to the grave. The explanation given for this prodigy was that as a pregnant woman was conversing with another, a third suddenly coming up from behind knocked their heads together, and the impression of the fright was communicated from the mother to the fetus."

\* Vide also Camerarius, Vol. II, p. 45.

There is a wood cut representing these girls as joined at the forehead, and looking into each other's eyes.

A representation of the manner of coining money in vogue at that time, is found at page 692, and at page 703, men and women are represented bathing together, entirely nude, in one of the mineral bath resorts. The *Vehm Gericht* is described on page 748, the animals of Prussia at 784, and the martyrdom of John and Hieronymus Huss at page 801.

At page 820 is an engraving which recurs very frequently throughout the book. The subject is, "A great contention between two kings." Two men in regal paraphernalia are represented as hauling and mauling and pulling and tugging at each other, in a tremendous state of excitement, clutching at each other's beards and hair and garments. This probably conveyed to the readers, better than the mere force of words, the close and violent nature of a combat between sovereigns.

On page 832 is a description of Norway, and of the monsters that abound therein. Among these the whale stands pre-eminent with a head shaped somewhat like that of a dog, with huge projecting tusks like those of a boar, and is shown in the act of swallowing a man, who is all out of sight except his head and arms. His comrade, more fortunate, appears on the mainland, naked and in full flight. A vessel is being sucked down into a whirlpool, of which the text states that there are many on the Norwegian coast. The ocean is seen swarming with fishes, and a man is portrayed following the sport of angling with a bait that resembles a bundle of hay.

The Lord's Prayer in the language of the Iapps and Finns is given at page 847, and on the same page a description of Iceland occurs, with a representation of Mount Hecla in full eruption.

A short description is given of *Greenland*, at page 850, as follows :

"Grünland means Green Land (*vi:ens terra*), so called on account of the luxuriant herbage found there. Of which, as well as of cattle, there is exceeding abundance, as may be seen from the reports brought back by those who have voyaged thither that they make great amounts of butter and cheese, from which we may conjecture that that country is not rough with mountains. It contains two Bishoprics, whose Bishops are ordained by the Archbishop of Nidross. The people, through the negligence of their spiritual pastors, have almost relapsed into heathenism, being of fickle disposition, and greatly given to magic arts. By means of incantations and spells, they are reputed to be able to raise, at will, tempestuous storms, and to cause the shipwreck of foreign vessels whose remains they desire to plunder. Their own vessels being of *skins*, and very light, are quite safe from collisions against their rocks."

An odd two-page illustration occurs at page 852 of the monsters which are to be found in the Northern Regions. So laughably absurd, so ridiculous and so diverse in their representations that no pen could ever attempt to describe them with the slightest approach to justice. On examining them one feels tempted to exclaim with Bottom, when he awoke from his asinine hallucination, "The eye of man hath not heard, the ear of man hath not seen, man's hand is not able to taste, his tongue to conceive, nor his heart to report" what these remarkable figures were intended to convey.

Monsters of every conceivable age, shape, size, appearance and color; fish with the heads of owls; whales with crocodile's scaly backs and the heads and tusks of wild boars; pig-headed animals with fish's tails and elephants' bodies; fish with cats' faces and ruffles around their bodies; fish that look like turnips and carrots; fish swallowing young pigs; fish with leopards' heads and claws; fish with wolves' heads; fish with oxen's heads; griffin-headed fish; fish with heads of birds and bodies like dock leaves; fish attacking men; gigantic lobsters and crawfish; wonderful fish that look like crows; a sea serpent swallowing a vessel; and many other objects which the credulity and superstition of our ancestors accepted in good faith. A whale is represented as attacking a vessel whose mariners are vainly endeavoring in accordance with the established custom to divert its attention from their ship by throwing overboard a number of small barrels or tubs; a usage from whence arose the saying of *casting a tub to the whale*, meaning to divert one by means of a lesser matter from a greater one. In one corner of the plate occurs the barnacle tree, already described, with its fruit.

At page 905 is the portrait of a monster who was born at Cracow in February, 1547, and lived three hours. It is a boy whose feet and hands terminate in four duck-like webs instead of fingers and toes. There grows out of each knee and out of each elbow a dog's head, being four in all, while from each of his breasts protrudes the head of a ram. At the bottom of the breast bone in his belly is an extra pair of eyes; a forked tail waves up to his head. He has a long and flexible elephant's proboscis in place of an ordinary nose; large and round, saucer-shaped eyes, and an extra pair of ears growing out of the corners of his eyes, which, as well as the ears in their usual position, are formed like those of a rabbit.

At page 1025 occurs the history of the Tower of Babel, apropos of which Munster gives the word *bread* in fourteen languages, and speaks of Noah as being identical with *Janus*.

The Phoenix is described on page 1034, and at page 1045 the Hyrcanian Tiger; the latter as follows:

"It is a large animal of various colors, which is quite tame when its hunger is appeased. It sleeps three days at a time and upon awakening it washes itself and raises a cry and emits a peculiar scent that attracts to it all sorts of wild animals, for with all such does it preserve friendly relations save with the dragon and with the asp."

The Tartars are described at page 1060 as being anthropophagi, and one of them is delineated as superintending the process of roasting a human body impaled upon a spit over a fire, in the act of turning the viand carefully so as to cook it evenly on all sides.

At page 1066 is a description of India and its customs, one of which is represented by a woodcut of an elephant attached to a plough and serving as a tiller of the soil.

Dragons are seen on page 1069 with all their usual fabulous horrors of scales and wings and jaws; duels between these animals are pictured as of

frequent occurrence. Nor is the griffin forgotten among the prodigies which nature is supposed to have lavished upon the lands of the Orient.

At page 1073 a hippopotamus is figured as a horned horse with huge fangs, whose body is half concealed in the river. Snakes are also represented with several heads, each of which bears a regal crown. Still further on (at page 1080) we find the Cynocephali, "the men whose heads do grow beneath their shoulders," the people who have but one eye and that in the centre of their forehead, a race of double-headed dwarfs and a nation whose feet are more than twice the size of the rest of their bodies. These last are represented as taking their ease on their backs under the shadow of their own feet, which they are holding propped in the air supported by their hands. The pygmies and their incessant warfare with their hereditary enemies the cranes, are not forgotten.

At page 1410 occurs a woodcut illustrative of the customs of Cathay which *modestia gratia* is transcribed in the German of the edition of 1563 :

"Wan̄ einer sein tochter nic kan ausstern, nimpt er trümen und pfeffen, und zeucht mit seine töchtern uff den marckt, und so jederman herzu laufft als zu einem öffentlichen spectakel oder schawspil, hebt die tochter ire kleider dahinden auff biss an die schultern, und lasse sich dahinden besehen, darnach hebt sie sich daformen auch auff biss über die brust, und lasst ihre leib daforme auch sehen, und so etwann etner do ist dem sie gefallt, der nimpt sie zu der eh, und thut kein blinden knuff."

The foregoing extracts will give a general idea of the work and its contents. To transcribe at greater length would be profitless, as the remaining matter for the most part presents no novelty either of subject or treatment. There are narrations of the voyages of Columbus and Vespucci, but differing in no wise from the generally received accounts.

There is a very remarkable map of the New World, which, however, I pass over for the present, intending in the hereafter to make it a study by itself.

It is needless to dilate upon the pleasure to be derived from the perusal of old books. Cardan says with much truth :

"That as in travelling the rest go forward and look before them, an antiquarian looks around about him, seeing all things, both the past, present and future, and so he alone hath a complete horizon." "Such studies allure the mind by their agreeable attraction on account of the incredible variety and pleasantness of their subjects and excite to further steps toward knowledge. What greater pleasure can there be than to peruse those books of cities put out by Braunus and Hogenbergius? To read those exquisite descriptions of Magulus, *Munster*, Herrem, Laet, Merula, Boterus, Leander, &c.? These famous expeditions of Christoph. Columbus, Americus Vesputius? These hodeporicons to remote and fabulous places of the world? To see birds, beasts, and fishes of the sea, spiders, gnats flies, serpents, &c., all creatures set out and truly represented?"\*

The book itself is one of those huge folios in which our ancestors so greatly had their delight; books with broad margins, heavy linen paper, good black ink, large type, bound in ponderous oak boards covered with stamped hogskin, and weighing several pounds. † "Scholars of a former

\* Burton.

† Murrail.



age regarded with contempt small books and a common reproach against a man was that he was the author of such." But the very magnitude of a work has often been the occasion of its neglect, as but very few persons have either leisure or inclination to wade through long series of ponderous tomes; a fact only apparent to book publishers within the last one hundred and fifty years. Such sized volumes tempt the reader to cry out as Macaulay did in his celebrated criticism upon Dr. Nares' life of Lord Burleigh.

The learning which gave rise to such works was as weighty, as solid, and as substantial as the volumes themselves. The period in which it flourished was before the day of easy paths to knowledge, compends, abridgments and short cuts; the royal road had not yet been discovered, the quagmires filled up, nor the forests leveled that obstructed the pathway. The consequence was that those who were scholars were more thoroughly and deeply learned than those of the present day. The diffusion of knowledge has seemingly resulted in sciolism; where once the few were educated, the many now are smatterers.

Knowledge is like a powerful stream, whose currents while checked within its banks flows deeply and strongly although silently; but when the obstructions which hem it on each side are removed, when the obstacles to its free dispersion are leveled, it spreads itself over the adjacent country, so that where once a noble river ran, naught now remains except a shallow babbling brook.

Diffusion of knowledge, as it is fashionable to call it in the cant of our day, is unfortunately frequently only a diffusion of ignorance.

*On a New Synthesis of Saligenin. By Wm. H. Greene, M.D.*

*(Read before the American Philosophical Society, January 16, 1880.)*

The method by which I have obtained saligenin synthetically is an application of a general method for the preparation of phenolic derivatives, made known by Reimer and Tiemann. Indeed, since by the reaction of chloroform or of carbon tetrachloride on an alkaline solution of sodium phenate salicylic aldehyde or salicylic acid may be obtained, it may naturally be expected that, under the same circumstances, methylene chloride would yield saligenin, the latter being an oxybenzylic alcohol.

A mixture of 30 grammes of methylene chloride, 30 grammes of phenol, and 40 grammes of sodium hydrate dissolved in 50 grammes of water, was heated in a sealed matrass in a water-bath. The reaction is complete in about six hours, after which the contents of the matrass is neutralized with hydrochloric acid, and agitated with ether, which takes up the saligenin and the excess of phenol. The ethereal solution is decanted, and the ether distilled off; the residue is repeatedly exhausted with boiling water, which takes up the saligenin and leaves the greater part of the phenol undissolved. The aqueous solution is concentrated to a small volume, and the drops of